What is claimed is:

1. A method for assessing an ice ball formation during the cryoablation of a target tissue in the vasculature of a patient, said method comprising the steps of:

providing a cryocatheter having a cryotip;

contacting said patient with a reference electrode;

positioning said cryotip proximate said target tissue;

measuring a first impedance between said cryotip and said reference electrode;

cooling said cryotip;

measuring a second impedance between said cryotip and said reference electrode after said cooling step; and

determining a ratio of said first impedance to said second impedance to assess the formation of an ice ball and an extent of the cryoablation of target tissue.

2. A method as recited in claim 1 wherein said first and second impedance are measured using a signal having a frequency of approximately 20khz.

3. A method as recited in claim 2 wherein said signal has an RMS voltage of approximately 0.5V.

4. A method as recited in claim 1 wherein said signal is produced by:

generating a square wave;

converting said square wave to a sine wave using a four pole, low pass, active filter; and

rectifying said sine wave using a plurality of analog switches driven by a 20khz signal that is phase shifted relative to said sine wave by approximately 90 degrees.

5. A method as recited in claim 1 wherein said cryotip includes an expansion chamber and said step of cooling said cryotip is accomplished by expanding a refrigerant in said expansion chamber.

6. A method as recited in claim 5 wherein said refrigerant is expanded in said expansion chamber until a ratio of two measured impedances is substantially zero.

7. A method as recited in claim 6 wherein said refrigerant is expanded in said expansion chamber after said ratio of two measured impedances is substantially zero.

8. A method as recited in claim 1 wherein said reference electrode is a backplate.

9. A method for assessing an ice ball formation during the cryoablation of a target tissue of a patient, said method comprising the steps of:

contacting the patient with a reference electrode;

providing a cryocatheter having a cryotip;

cooling said cryotip to create an ice ball and cryoablate said target tissue;

generating a measurement signal having a frequency in the range of 15 to 25khz and an RMS voltage of less than 1.0V; and

using said measurement signal to measure a current between said cryotip and said reference electrode to assess the formation of said ice ball.

10. A method as recited in claim 9 wherein said measurement signal is generated by:

producing a square wave;

converting said square wave to a sine wave using a four pole, low pass, active filter; and

rectifying said sine wave using a plurality of analog switches driven by a signal that is phase shifted relative to said sine wave by approximately 90 degrees.

11. A method as recited in claim 9 wherein said cryotip includes an expansion chamber and said step of cooling said cryotip is accomplished by expanding a refrigerant in said expansion chamber.

12. A method as recited in claim 11 wherein said refrigerant is expanded in said expansion chamber until said current is substantially zero.

13. A method as recited in claim 11 wherein said refrigerant is expanded in said expansion chamber after said current is substantially zero.

14. A method as recited in claim 9 wherein said reference electrode is a backplate.

15. A system for assessing ice ball formation during the cryoablation of a target tissue of a patient, said system comprising:

a reference electrode for contacting said patient;

a cryocatheter having a cryotip;

a means for positioning said cryotip proximate said target tissue;

a means for cooling said cryotip to create an ice ball and cryoablate said target tissue; and

an electronic means connected to said cryotip and said reference electrode to measure an impedance therebetween to assess formation of said ice ball.

16. A system as recited in claim 15 wherein said electronic means measures said impedance using a signal having a frequency of approximately 20khz.

17. A system as recited in claim 16 wherein said signal has an RMS voltage of approximately 0.5V.

18. A system as recited in claim 15 wherein said electronic means comprises:

a means for generating a square wave;

a four pole, low pass, active filter for converting said square wave to a sine wave; and

a plurality of analog switches, said switches for rectifying said sine wave driven by a 20khz signal that is phase shifted relative to said sine wave by approximately 90 degrees.

19. A system as recited in claim 15 wherein said cryotip is formed with an expansion chamber and said means for cooling said cryotip includes a means for expanding a refrigerant in said expansion chamber.

20. A system as recited in claim 15 wherein said reference electrode is a backplate.